

Climate, Agriculture and Man

Shrinking Biodiversity
and Sustainability

Vinod K. Sehgal



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Shrinking Biodiversity and Sustainability**

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Cover Photograph of Lake City of Nainital

Lake City of Nainital, popular hill station in the Indian state of Uttarakhand situated 29° N and 78°8 E, 6,000 feet altitude in mid hills of Kumaon region of central Himalayas. The city is blessed with scenic natural beauty of the majestic Himalayas, rich biodiversity which attracts large number of tourists from India and the world. Its fragile ecology is seen in patches of shrinking conifer forests, fragile mountain slopes, frequent landslides and unplanned human habitation. This place also has a living fossil tree, Ginko biloba, at the entrance to Governor's House, Nainital, Kumaon Himalayas.

Preface

Shrinking Biodiversity, the theme of this presentation is based on the perceptions that after 1940's Second world war discovery of DDT and Malthusian increase in human populations triggered by Green Revolution of early 1960's, exploitation of natural biodiversity resources increased far beyond the nature's ability to renew them. Even the quality of human resource decreased as evidenced by many fold increase in incidence of several diseases. Nature took millions of years to evolve the present dispensation of diversified flora and fauna. I have tried to show how shrinking or vanishing biodiversity at a rapid rate has affected every component of living natural biodiversity resource, including man himself. Interactions between environment and evolving populations, like competition for food, space, predation etc. are the major causes driving many species of flora and fauna to extinction.

For this study of Shrinking Biodiversity, I selected major resources of Insects, Plants and Man as together they constitute almost two third of known biodiversity resources. Few insects groups like locusts and grasshoppers which have retained primitive polyphagy, are also known to avoid several plant species. This is because insects have highly evolved senses to identify cue chemicals emanating from host-plants. Each of the diverse range of topics discussed in this write-up can be a subject of an independent treatise. To remain focused on the theme Shrinking Biodiversity, several of such topics have been kept short and precise. For too long, insects have been considered to co-evolve with their host-plants as a result of genetic feedback mechanism resulting in large diversity of secondary plant chemicals. Specific studies on internal plant feeders like leaf mining agromyzid flies have demonstrated that insect feeding alone rarely build up selection pressures to force co-evolutionary changes in their host-plants. Rather, plants evolve independently due to varied selection pressures like herbivory including insect feeding and also

genotype environment interactions; insects just follow by adjusting their feeding responses by sequential evolution on closely related plant species.

Willful neglect and intervention by man into natural and agro-ecosystems together with deforestation, forest fires, urbanization etc. has caused shrinkage of natural biodiversity resources leading to unsustainability of climate, agriculture and man himself. I take full responsibility for the views expressed herein.

V.K. Sehgal

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V.K. SEHGAL

Planet Earth's Largest Living Ecosystem, the Biosphere



Fig. 1. *One in Millions. Planet Earth's Largest Living Ecosystem, the Biosphere as seen from the Moon.*

The Apollo 17 crew caught this breathtaking view of our home planet as they were travelling to the Moon on Dec. 7, 1972. It's the first time astronauts were able to photograph the South polar ice cap. Nearly the entire coastline of Africa is clearly visible, along with the Arabian Peninsula.

Image Credit: NASA, Last Updated: Dec. 7, 2015

*“You develop an instant global consciousness, a people orientation, an intense dissatisfaction with the state of the world, and a compulsion to do something about it. From out there on the moon, international politics looks so petty. You want to grab a politician by the scruff of the neck and drag him a quarter of a million miles out and say, ‘Look at that, you son of a *****.’”*

Edgar Mitchell, Apollo 14 astronaut, *People* magazine, 8 April 1974

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